THE ZOOLOGIST.

THIRD SERIES.

Vol. XVI.] OCTOBER, 1892. [No. 190.

THE CAUSE OF GROUSE-DISEASE, AS EXPLAINED BY Dr. KLEIN, F.R.S.

For the volume on this subject recently published by Dr. Klein* we have not been altogether unprepared. It will be in the recollection of our readers that in 1887 Dr. Klein, at the request of the Editor of 'The Field,' undertook to investigate this subject, and proceeded for that purpose to Scotland, where he was enabled to examine, immediately they were found, birds of all ages which had died from the so-called grouse-disease.

The result of the investigations then made was published in a Report (Zool. 1887, pp. 327—337), which may be said to have paved the way for the more comprehensive and illustrated treatise now before us.

From time to time various theories have been put forth to account for the disease, but none have been supported by evidence sufficient to warrant their unqualified acceptance. Dr. Klein examines the views of five different observers by way of introduction to his subject. The late Dr. Cobbold, a high authority on the nature and development of parasites, is first quoted as the founder of a theory of grouse-disease. In Dr. Cobbold's opinion, the ailment was due to parasitic invasion —or, in other words, to the infestation of the birds by worm

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* 'The Etiology and Pathology of Grouse Disease, Fowl Enteritis, and some other Diseases affecting Birds.' By E. Klein, M.D., F.R.S. With fifty-three illustrations. 8vo, pp. 140. London: Macmillan & Co.

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parasites. A round worm (or nematoid) he believed to be the cause of the disease. Such a worm is constantly found in grouse, while tape-worms were also credited with helping a fatal result. But the parasitic theory is disposed of on the simple ground that hardly a grouse is found to be free from worms in its digestive system; and perfectly healthy birds (using the word "healthy" in the ordinary sense of the term) are found to possess both forms of worms independently of any symptoms of grouse-disease. Both Mr. Colquhoun and Dr. Macdonald in turn deal with secondary causes of the disease rather than with primary conditions. They regard the weakening of the bird's constitution by such causes as bad seasons, insufficient food, and over-stocking as the prime factors in inducing the ailment; but such opinions, while deserving of consideration, leave the idea of a specific cause undiscussed. The fourth and fifth investigators are Dr. R. Farquharson and Dr. Andrew Wilson. In 1874 Dr. Farquharson expressed the belief that grouse-disease was "an epidemic and infectious fever." Dr. Andrew Wilson, as the result of his independent dissections and observations made about the same period, refuted Dr. Cobbold's views, and in a paper (from which Dr. Klein quotes) read before the Medico-Chirurgical Society of Edinburgh, and subsequently published in the 'Edinburgh Medical Journal,' showed that the disease was characterised by inflammatory symptoms of the respiratory and digestive organs. He laid particular stress on the inflamed state of the lungs in diseased birds, and suggested that the ailment was of an infectious type.

Dr. Klein now comes into the field, armed with the latest methods of germ research. He finds the views of Dr. R. Farquharson and Dr. Andrew Wilson to be those which best harmonise with the facts. He confirms the evidence obtained by Dr. Wilson after repeated dissections of diseased birds; and the grouse-disease has thus at last passed from the limbo of obscurity, and has come to rank as an infectious malady, owing its existence to the multiplication in the bodies of the birds of a specific germ whose conveyance from the sick to the healthy grouse accounts for the spread of the ailment.

A thorough examination of the symptoms and characters of the grouse-disease shows that it is an ailment due to the propagation and multiplication within the bodies of these birds of a specific germ. This much Dr. Klein has clearly proved. The chief changes he finds, as Dr. Wilson found, in the lungs, while congestion of the liver is also a conspicuous sign. No germs could be found in the blood of grouse which had died of the disease in June, 1887 (Zool. 1887, p. 334), nor could any microbes be found in the liver, lungs, kidneys, or blood of grouse which had perished in the spring and summer of 1888, 1889, and 1890. But when the same organs (lung and liver) of grouse which have been affected in the spring and early summer are examined, a very definite species of germ is found, forming, as Dr. Klein tells us, "continuous masses or plugs in some of the capillary (or finest) blood-vessels," while in the blood of the general circulation these germs "cannot be demonstrated." This is nothing unusual in the life-history of germs. There are many germs capable of producing disease which do not thrive or live in the blood itself, but do thrive and multiply in some organ or other, of which liver and lungs are good examples. The bacillus or germ of grouse-disease is of course a microscopic living particle, which in the fresh state is a spherical, or more generally an oval, corpuscle, "occasionally more distinctly rod-shaped or cylindrical with rounded ends." These germs occur singly, or are more commonly double—that is, under the shape and guise of dumb-bells. Most of them seem to possess no movement of their own, though now and then active locomotion is observed, the microbe spinning round or darting through the field of the microscope with an oscillatory movement of its body. In recent cultures of the germ the number of mobile microbes is greater than when the cultivation is of some age, from which fact Dr. Klein draws the conclusion that in the cultures there is produced some chemical substance that inhibits their movements.

Mice inoculated with the cultivated germ of grouse-disease die in from thirty-six to forty-eight hours. It is incidentally mentioned that the vitality of the germ is great, since cultures made in gelatine and kept for a year and a half proved to be capable of multiplying their kind. This fact has to be kept in mind in view of the explanation of the propagation of grouse-disease from year to year.

Used to inoculate certain birds, however, the germ of the grouse-disease is seen to be singularly powerful in its effects. The Common Bunting and Yellowhammer are specially susceptible to its action. Some of these birds die at the twenty-fourth hour after inoculation. Sparrows in the proportion of about 70 per cent. also die with characteristic *post mortem* appearances. But one notable fact crops out in the course of Dr. Klein's researches. No result follows when the birds, or mice, or guinea-pigs are fed with the germ of grouse-disease. This proves that the vitality of the germ is either destroyed by the digestive juices, or that the natural method of inoculation is certainly not through the stomach. But, as Dr. Klein remarks, it is otherwise with the lungs. A bird inoculated with grouse-disease was placed in a cage with two healthy birds. The inoculated bird died during the second day; and the other two birds were found to be ill the day following, and died of the disease in the course of the third day, with a full development of the germs in their blood and in their lungs. Again, two wire cages were placed closely side by side. One contained a Yellowhammer affected by the disease after inoculation. It had been ailing for some days. In the adjoining cage were six healthy Yellowhammers. The two cages, says Dr. Klein, were covered with one cloth. All six birds in the second cage became ill with the disease in two days, and died during the next day, with all the symptoms of the disease. It is clear, then, from these details that the grouse disease is propagated not in food, but through the air. It is essentially and primarily a lung or respiratory trouble, which, as might naturally be expected, draws its infection from the air, and, of course, from pre-existing cases of the disease.

To the subjects treated in the second part of Dr. Klein's book, namely, fowl cholera, fowl enteritis, and "cramps" in young pheasants, we need not now refer. Our concern for the moment is with grouse-disease only, and upon this enough has now been said to explain the line of investigation pursued by Dr. Klein, and the nature of the results arrived at. The question is one of extreme interest to naturalists, and of even greater importance to those sportsmen who pay large rents for grouse-moors. The latter will naturally ask, "What is the remedy?" An enquiry not readily answered.

The only measures likely to be available in checking the disease are not so easy of application. It is all very well to say that a sharp look out should be kept for Grouse which are anywise affected, and that these should be killed off and their bodies cremated to prevent the diffusion of germs. But one cannot look over grouse on a moor as if they were chickens in a poultry yard, nor diagnose their condition when on the wing at a distance. A great many diseased birds are sure to escape detection until, too late, they are found dead or dying.

Heather burning has much to recommend it, and, as at present advised, we have more faith in that, and in the avoidance of over-stocking, than in any other so-called preventatives.

ON THE BREEDING OF THE SAND GROUSE IN CAPTIVITY IN DENMARK. BY HERLUF WINGE.*

TRANSLATED AND COMMUNICATED BY HAROLD RAEBURN.

WITH regard to the Sand Grouse, *Syrrhaptes paradoxus*, in a wild state in Denmark, in 1891, there is no reliable information; but Herr Bertel Christensen, of Kjöbenhavn, has kindly made the following communication on the great success he has met with in inducing this bird to breed in captivity. He says:—

"Seeing that my pair of Sand Grouse (*Steppehöns*) during the summer of 1890, had laid eggs which were all fertile, though no living chick was hatched,† I took great pains during the spring of 1892 to obtain better success, which was happily attained.

The first egg was laid on June 15th, and, as appears below, I obtained in all nine eggs. Seeing that the Sand Grouse, even after being in captivity since 1888, were still very shy, there seemed no probability that they would hatch their own eggs. By the kindness, however, of the Directors of the Zoological Gardens of Kjöbenhavn, I obtained the loan of a bantam (*Rugehöne*), which proved to be an excellent sitter, and from the middle of May to the end of August carefully brooded the eggs of Sand Grouse, Chinese and Francolin-Quails (*Frankolin-Vagtler*), which I placed under it during the course of the summer.

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* 'Vidensk. Meddel. Naturhist. Forening i Kjöbenhavn,' 1892, pp. 126—130.

† Op. cit., 1891, p. 129.

Occasionally when the Quail or Sand Grouse chicks (*kyllinger*) were about to break the shell, it became somewhat impatient, and pecked at the egg in order to let the chicken out, and in consequence two fully developed young Sand Grouse perished in the shell. The first chick, hatched on July 9th, was too firmly attached to the shell, and from the hæmorrhage caused by the loosening of the membrane it became very weak, and died the same day.

Three others which at various times were hatched, and became fully developed and lively, were smothered under the hen a few hours later, although, warned by previous experience, I watched them closely, and would have taken them from the hen as soon as they had become dry.

Two of these, hatched on July 24th, were very lively, and I was already congratulating myself that success was at length achieved. I would only have to allow them to rest a little after their great efforts, which it appears the Sand Grouse must exert to break the shell, for the chipping commences about the 20th—21st day, whilst the young bird does not appear until the 23rd—24th day. But in less than a quarter of an hour after I had last seen them, they both lay smothered beneath the hen.

At length, on August 6th, two chicks were safely hatched. I took them from the hen in due time, and placed them in a tolerably simple "artificial mother" (*kunstig moder*), made of an oblong tin tray, the lower part of a bird-cage (*fuglebur*), under which a small oil-lamp was placed, to give the necessary warmth.

It only remained to find suitable food to rear them on. I tried moistened ants' eggs mixed with egg-bread, and yolk of egg, together with bruised millet-seed; but although the much smaller Francolin Quails (*Frankolin-Vagtler*), which were hatched almost at the same time, thrived well on this, and easily swallowed an ant's egg, the Sand Grouse, which were awkward and helpless (*ubehjelpsomme*) in the extreme, seemed unable to find nourishment in it, and one died on Aug. 11th. Unfortunately, I had thought too late of trying them with grass- and clover-seed (*græsfrö og kloverfrö*). The survivor thrived well on this, and is now (9th April, 1892) in the best of health, and very tame. Its colour is at present like that of the adult female. It is somewhat smaller than the old bird, but is perhaps not yet full grown.

A young one hatched on August 18th was smothered under the hen.

The following is a summary of the results:—

June 15.	One egg.	Destroyed by hen.
„ 17.	One egg.	Young hatched July 9th, died.
„ 27. „ 29. „ 30.	Three eggs.	Set under hen July 1st; two young hatched July 24th.
July 8. „ 10.	Two eggs.	Set under hen July 13th; two young hatched August 6th.
„ 20.	One egg.	Destroyed by hen.
„ 22.	One egg.	Hatched August 18th.

Thanks are due to Herr Christensen, not only for this information, but also for permission to draw the living young Sand Grouse, while the Zoological Museum at Kjöbenhavn is indebted to him for one of the dead chicks, together with the egg-shell belonging to it.

The newly-hatched chick agrees very well on the whole with Prof. Newton's description and figure ('The Ibis,' 1890, pp. 207—214, pl. vii.) of the young bird which was obtained in Scotland in 1889, the only one which has hitherto been closely studied. Yet the colour-marking, especially on the head, is more regular than in Professor Newton's figure, reminding one rather of Mr. Bartlett's figure of the young of *Pterocles alchata* (Proc. Zool. Soc. 1866, pl. ix.).

Thus there is a very distinct light stripe over the eye, and another running from the gape along the cheek to behind the ear. The down resembles in every respect that of the *Charadriidæ*, *Scolopacidæ*, and *Laridæ*.

I saw the living Sand Grouse chick for the first time on August 18th, when it was twelve days old. The next day it was sketched and painted by Herr H. Grönvold (pl. iv. fig. 2). It was then still for the most part in down; but, on the back and wings especially, the feathers were just ready to sprout. Many of the sprouting feathers had still their "down-pencil" on the tip (*dunpenselen i spidsen*, pl. iv. fig. 3). Unlike what is seen in the adult Sand Grouse, the feathers of the back and wing-coverts were marked tolerably uniformly and regularly, every feather being bordered with a light and dark stripe, the rest light, with a couple of dark arrow-shaped cross-bars in regular marking, reminding one strongly of the corresponding feathers among the different species of Hemipode (*Turnix*).

Some years ago my brother, the late Oluf Winge, gave it as his opinion that the Hemipodes were the nearest relations of the *Pteroclidæ* among known birds, and that the Hemipodes were not *Gallinæ*, as one used to consider them, but came nearest to the doves. Since then I have myself gone into the question, and compared the skeletons of the two birds, and I must say that I hold the same opinion.

The little chick ran quickly about, standing well up on its legs. It did not utter any whistle, but clucked "gilik" like the old birds, only in a higher key. It was said that it often grovelled in the sand (*ofte vælteде sig i sand*). Some days later it was photographed. It had then grown somewhat larger, the feathers had sprouted out more, and several of the downy points (*dunspidserne*) had fallen off, but otherwise it had not materially altered in appearance. On October 13th, when the chick was a little over two months old, I had again an opportunity of observing it more leisurely and of comparing it with its parents. At a distance it was very like its mother, only perceptibly smaller. On the back and shoulders it had acquired new feathers; the wing-coverts especially were somewhat altered in appearance, being partly of a light yellow colour, partly light with a single dark kidney-shaped spot, partly light with very irregular dark bars and marblings. The pinion and tail-feathers were, on the contrary, unchanged. The first primary was not almost uniformly coloured, as in the old birds, but the tip and inner web were marbled with darker markings. The tail-feathers were considerably smaller, more mottled than in the case of the old birds, and dark with a lighter border, and with a few light spots towards the edge as a widening of the light border, though not amounting to a barring of light and dark.

Mr. D. G. Elliot, in his Study of the *Pteroclidæ* (Proc. Zool. Soc. 1878, pp. 262, 263), describes the primaries of the young Sand Grouse almost as in the old. The tail-feathers, on the contrary, he describes somewhat as here noted.

On February 2nd, 1892, when nearly six months old, the young bird was compared with a number of skins of adult Sand Grouse, and there then appeared two points of difference which had before been overlooked. The dark stripe, which in the adult bird runs along the whole of the under side of the primaries, did not extend to the tip, and the three outermost wing-coverts were not, like the others, yellow with a single dark stripe along the middle, but were marked at the tips with large irregular bars. Several of the young bird's marbled primaries and mottled tail-feathers were by this time moulted, and were replaced with feathers which were exactly like those of the adult bird.

[Here follows a description of the Plate (pl. iv.), on which are figured (1) a newly-hatched chick, (2) a chick of thirteen days old, and (3) an immature feather with the "down-pencil" on the tip.]

THE STATUS OF THE WOODCHAT, *LANIUS RUFUS*, IN GREAT BRITAIN.

By O. V. Aplin.

Willughby refers clearly to the Woodchat as "another sort of Butcher-bird," but does not state where his specimen was procured, and the earliest mention of it as a presumably British bird is to be found in Gilbert White's 25th letter to Pennant. "A gentleman (he says) sent me lately a fine specimen of the *Lanius minor cinerascens cum maculâ in scapulis albâ Raii;* which is a bird that, at the time of your publishing your two first volumes of 'British Zoology,' I find you had not seen. You have described it well from Edwards' drawing." This letter is dated from Selborne, the 30th August, 1769. Montagu in 1802 had never seen a specimen, and doubted if it was a distinct species; but in 1813, in the "Supplement" to his 'Ornithological Dictionary,' he expresses himself satisfied on this point. He remarks, however, "it is esteemed so rare in England, that we question if there is at present a specimen in existence that was killed in the island." Selby in 1825 could not include it in the first edition of his 'Illustrations of British Ornithology,' though he did so in the second (1833).

In Professor Newton's edition of 'Yarrell,' after an enumeration of some specimens and nests referred to hereafter, the following details are given :—"The bird has been obtained near Brighton, and a second time in Kent, while some four or five examples are said to have been procured in Suffolk, and about as many in Norfolk, though the assertion of Hunt, that it had bred in the county last named, very likely originated in error. Further inland it is stated to have been met with in Surrey, Hertfordshire, Nottinghamshire, Derbyshire, Worcestershire, and Yorkshire." Mr. R. Gray remarks that it is included in 'Don's list of the Birds of Forfarshire,' but it seems not to have been noticed in Scotland by any other observer; and the evidence therefore of its occurrence there must be regarded as unsatisfactory. There is no proof of its occurrence in Ireland; nor have I been able to discover any record of its having visited any of the Welsh counties.

Mr. Howard Saunders, in his 'Manual of British Birds,' p. 145, writes, "Not more than thirty examples are known to have been obtained in England during the last hundred years." The following preserved specimens, of which the history has been lost, may be amongst those referred to by him.

Mr. W. Eagle Clarke, of the Science and Art Museum, Edinburgh, writes me word that they have there two adult males, which came to them with the Edinburgh University collection, and bear the original endorsement, "England. Purchased, 1824." He adds, "Unfortunately it is now quite impossible to ascertain more about them." In the British Room at the British Museum there is a nest and two eggs with no label, but the nest contains a slip of paper on which is written in ink, "Woodchat Shrike. Taken June 15th; two eggs with nest."

There is also in the British Museum a nest labelled, "Banks of Thames. Presented by the late John Gould." With regard to these, and other nests, it is worth noting that the late Mr. Gould, writing in 1873, and referring to the alleged nesting of the Woodchat in this country, says, "For myself, I have never seen an authenticated egg which had been taken herein" ('Introd. Birds Great Britain,' p. 52). But whether he had not seen the Isle of Wight eggs, or did not believe in them, does not appear.

Mr. W. Evans informs me that he has seen an old specimen of the bird in the Berwick Museum "which may have been obtained on the Scotch side of the border."

The following instances of the occurrence of this bird in England have been recorded:—

NORTHUMBERLAND.—One shot near Bamborough, 29th April, 1859. In collection of Mr. H. Cresswell, of Cresswell Tower (Hancock's 'Cat. Birds Northumberland and Durham,' p. 42).

DURHAM.—Bewick in 1826 figured a Shrike which was shot at Auton Stile in this county in September, 1824, and which he supposed was a Woodchat, but as remarked by Selby ('Illustr. Brit. Orn.,' i. p. 154), it is not so fully described as satisfactorily to identify the species, and the figure bears a greater resemblance to the female or young of *Lanius collurio* than to any state of the adult Woodchat; for the female of this species, like the male, possesses the distinguishing patch of white upon the scapulary feathers. It is possible, however, that it may have been a young Woodchat, in which case it would resemble the female of the Redbacked Shrike.

CUMBERLAND.—One seen by Mr. Dickinson near Stainburn tannery in the spring of 1872 (Macpherson and Duckworth's 'Birds of Cumberland,' p. 29). Another seen "at Woodside, many years since, by James Cooper (J. B. Hodgkinson MS.)" (*op. cit.*).

LANCASHIRE.—One shot near Lancaster (MSS. of late Revd. J. D. Banister, quoted by Mitchell ('Birds of Lancashire,' p. 50). Another shot at Walton-le-dale, 1870 (*op. cit.*).

YORKSHIRE.—One received by Leadbeater in a fresh condition, and stated to have been killed in Yorkshire (Selby, 'Illust. Brit. Orn.,' vol. i. p. 153). Two young birds obtained at Scarborough by Mr. A. S. Bell, 1860-61 (Eagle Clarke, 'Birds of Yorks,' p. 61). An adult male shot at Hackness, near Scarborough in June, 1881. In Mr. R. Chase's collection.

NORFOLK.—One killed near Beechamwell, *fide* Scales, who had known it to breed and rear its young there (Stevenson's 'Birds of Norfolk,' p. 64). One killed at Swaffham, recorded by Lubbock, and said by him to have been in Mr. Hamond's collection. This is possibly the bird seen by the Revd. R. Hamond of Swaffham, and followed by him for a considerable distance, as recorded by Selby ('Illust. Brit. Orn.,' vol. i. p. 153). A male, nearly adult, shot at Yarmouth, 29th April, 1859. In Mr. J. H. Gurney's collection. An adult male shot in the Apollo Gardens, Gt. Yarmouth, and received in the flesh, on the 16th May, 1885, by Mr. R. W. Chase of Edgbaston, who heard that several others were obtained on the east coast further north. In Mr. Chase's collection (Zool. 1886, p. 27). Mr. J. H. Gurney, in 1884, considered that this was the only veritable Norfolk specimen (List of Birds in Mason's 'History of Norfolk').

Suffolk.—An adult male shot at Lound, near Lowestoft, 2nd May, 1859 ('Birds of Norfolk,' p. 64). An adult male shot at Henham Hall, 10th May, 1860, by Mr. T. M. Spalding of Westleton; formerly in his collection; now in the collection of Mr. J. H. Gurney. One killed at Bradwell, Suffolk, April, 1829, referred to by Messrs. Paget in their 'Nat. Hist. Gt. Yarmouth.' Another example is mentioned in Messrs. Gurney and Southwell's list as having occurred at Gorleston, but I learn from the Revd. Julian G. Tuck that the three first are the only reliable instances of the occurrence of the Woodchat in Suffolk.

Essex.—One seen by Mr. Ambrose in the Colchester Highwoods (Miller Christy, 'Birds of Essex,' p. 106). Two, male and female, received in the flesh by Mr. Travis, 27th August, 1880. Said to have been shot (by a man named Jeffrey) between Elmdon and Arkesdon (*op. cit.*). A pair seen by the late Dr. E. G. Varrenne on a farm near Mark's Tey (*op. cit.*). In the British Museum collection is a nest labelled "Epping. Presented by J. Gould, Esq."

Northamptonshire.—One seen in Gore Piece, near Duddington, in the spring of 1869 (Lord Lilford's 'Notes on Birds of Northamptonshire,' p. 45). One, a female, picked up dead on a fallow field near Stamford, 8th January, 1883 ('Field,' 13th January, 1883). Mr. A. G. Elliott preserved it for his collection (Zool. 1883).

Nottinghamshire.—A male, shot in May, 1859, in Sherwood Forest, near the western entrance to Thoresby Park, by Mr. H. Wells (Sterland and Whitaker's 'Birds of Notts,' p. 12).

Derbyshire.—"I have a note of observing a Woodchat May 19th, 1839, operating on a Yellow Bunting which it had firmly impaled to a thorn" (Briggs, Zool. 1850, p. 2478). Mr. F. B. Whitlock states that this is the only note he has of the Woodchat in Derbyshire.

Hertfordshire.—One shot near Baldock, Herts, spring of 1856, and preserved by Norman, birdstuffer, of Royston (E. J. Tuck, Zool. 1856, p. 5203). Another seen by Rev. H. A. Macpherson near Hertford, in May, 1873 (Trans. Cumberl. and Westmorl. Assoc. no. ix.).

Berkshire.—One in the British Museum labelled, "Reading. Theo. Fisher, Esq." This is not mentioned in vol. viii. of the Catalogue of Birds.

WORCESTERSHIRE.—Mr. C. Parkinson of Worcester assumes that the authority for the statement in 'Yarrell, British Birds,' as to the occurrence of the Woodchat in this county, is Hastings' 'Illustrations of Nat. Hist.,' Worcester, 1834, pp. 62—72: Birds. Mr. Parkinson in a letter to me adds:—"In June, 1890, in the Teme Valley, between Powick and Bransford, I saw an unfamiliar Shrike drop down suddenly and silently over a tall hedge into a dense hazel coppice. I know the red-backed species very well. It was quite different in flight and extremely shy: about the size of the red-backed species, very white on the under parts, and a pronounced red patch on the back of the head; a little white at the base of the dark bill. I never found it again; but an examination of the ground beneath the hedge revealed a young Linnet with the skull broken in. Without having had the bird in my hand, I feel sure it was a male Woodchat, chiefly from the peculiar manner it dropped down into the thicket, and the general appearance, which was not that of the red-backed species."

WILTSHIRE.—One seen by Mr. Arthur H. Macpherson in Savernake Forest, 6th June, 1884. It was a very brightly coloured bird, and very tame (Zool. 1888, p. 429). Another said to have been killed at Salisbury is mentioned in the same note. The Rev. H. A. Macpherson was informed that it was shot some few years before he saw it by a relative of the man who showed it to him (at Reading) as an unknown bird.

SURREY.—An adult bird of this species was seen by H. L. Meyer between Hatchland and Guildford, perched on an oak bough. He figures the bird in his 'Illustrations of British Birds,' 1842, pl. 44.

KENT.—One in the British Museum, a young male, formerly in Leach's collection, and labelled "Kent" ('Yarrell's Brit. Birds,' vol. i. p. 216). This bird is mentioned in G. R. Gray's 'Catalogue of British Birds' (1863), and is probably the bird which was "killed in the neighbourhood of Canterbury" (Jenyns' 'Manual Brit. Vert.,' p. 96). It is not enumerated, however, among the specimens now in the museum in vol. viii. of the Catalogue of Birds. The author of the 'Manual,' in reply to my enquiries, has written to say that at this distance of time it is impossible to remember his authority for the locality, his book having been published in 1835. Mr. W. Oxenden Hammond of

St. Albans Court, Wingham, writes:—"As to the Woodchat, about three years ago I heard from a birdcatcher at Dover that he had just caught one. I went at once to see it, and learn about it. The bird was in beautiful plumage, all the feathers, tail and wings, perfectly clean. The owner told me that his men had taken it in the warren near Folkestone. That when they saw the bird it entered a dense clump of bramble, going to the bottom, and that they enclosed it in the bramble, and so caught it. I look on it with a certain amount of suspicion." This bird is in Mr. Hammond's collection. Another was seen and shot by Capt. H. W. Hadfield (but escaped wounded by creeping into a hedge) on 14th May, 1857, close to Tunbridge. As it flew past he observed that it had a fly in its beak. The rufous of the head and neck and white underparts were remarked (Hadfield, 'Zoologist,' 1857, p. 5685).

SUSSEX.—Mr. Edwin Pratt, of Brighton, tells me that he shot an adult male Woodchat on the 4th May, 1866, at Preston, near Brighton. It was seen in the flesh by the late Mr. E. T. Booth, and by Bishop Wilberforce, and was purchased by the latter ('Zoologist,' 1866). See also the 'Birds of Sussex' (p. 39), by Mr. Borrer, who considers that it is the specimen mentioned in 'Yarrell' (vol. i. p. 216). Mr. F. Henniker, of Carcolston Hall, Bingham, Notts, writes me word, "I am quite certain that I saw a pair of Woodchats in the parish of Slaugham (near Crawley), Sussex, in the year 1870, and I think if you knew anyone living in the vale between the Forest Range of Sussex, and the South Downs, you would be almost sure to hear of one or more pairs." Mr. Thomas Parkin has recorded ('Zoologist,' 1892, p. 229) the occurrence of an adult male at Fairlight, near Hastings, in the first week of May, 1892. I am indebted to Mr. G. W. Bradshaw of Hastings for a beautifully executed photograph of this specimen taken after it was set up.

HAMPSHIRE.—"Jesse quotes from Gilbert White's MS. notes that a hen Woodchat was seen washing at Wellhead, attended by the cock, and that the former was shot." No date is given (Jesse's Gleanings, second series, p. 161). Mr. A. G. More was informed that the Woodchat had bred twice at Freshwater, and that one of the nests with eggs, as well as a young bird shot there in September, 1856, were in the collection of the late Mr. F. Bond (*vide* 'Zoologist,' p. 6851). The bird (labelled on the back of the case, in Mr. Bond's handwriting, "Shot by Mr. H. Rogers, Freshwater, Isle of Wight, September, 1856"), is now in Mr. R. W. Chase's collection, where I have seen it. "As some pairs are sometimes to be seen [in the New Forest] in the summer, I should not be surprised to hear of its breeding, more especially as Mr. Bond has obtained the eggs in the Isle of Wight" (Wise's 'New Forest'). The late Mr. Braikenridge had a nest and eggs from the same source ('Yarrell, Brit. Birds,' vol. i. p. 216).

Dorsetshire.—Pulteney says, "I have not seen the Woodchat, but am assured it has now and then been shot in Dorsetshire" (Mr. Mansel Pleydell's 'Birds of Dorset,' p. 17). One was killed at Bloxworth (*fide* Rev. O. P. Cambridge, 'Birds of Dorset,' p. 17). Some eggs of the Woodchat in the county museum are stated to have been taken from a Dorsetshire nest ('Birds of Dorset,' p. 17). In June, 1876, Mr. Arthur Lister, "being on the Lyme Regis undercliff with a companion, both provided with good telescopes, observed a male Woodchat perched on one of the bushes which abound on that vast tract of tumbled ground." He made a sketch of the bird while watching it, and carefully noted the colours, which he correctly described in 'The Field,' 8th July, 1876.

Somerset.—One shot near Bristol, in Somerset, is preserved in the collection of the Rev. A. C. Smith ('Birds of Wiltshire,' p. 123). Another, in the collection of the late Mr. Charles Prideaux, of Kingsbridge, Devon, is stated to have been killed in Somersetshire ('Zoologist,' 1852, p. 3474).

Devon.—One was shot at Mutley, by Pincombe, of Devonport (Bellamy, 'Nat. Hist. S. Devon,' 1839, p. 200). Another, immature, was obtained at Kingsbridge ('Zoologist,' 1852, p. 3474; Mr. D'Urban's 'Catalogue of Birds of S. Devon'), and was preserved in the collection of the late Mr. Prideaux of Kingsbridge. The Rev. Murray A. Mathew informs me that in the collection at Millaton Hall, Bridstow, he noticed a case containing an adult and immature example of this Shrike, which had been mounted, evidently some years before, by an Exeter birdstuffer named Tucker (MS. notes). A female Woodchat in moult, with plumage much worn, was caught near Plymouth in October, 1866, and was purchased by the late Mr. Gatcombe ('Zoologist,' 1867, p. 557). It is now in the collection of Mr. J. H. Gurney. Mr. D'Urban, in his 'Catalogue,' adds, "Another specimen is said to have occurred in Devon." Some further particulars are given by Messrs. D'Urban and Murray Mathew in their recently published work on the 'Birds of Devon,' 1892, p. 50, where it is stated that some of the late Mr. Prideaux's birds are deposited in the Town Hall at Kingsbridge.

Cornwall.—An adult male was caught in a boat off Scilly, September, 1839 (in the text of the work, 1849; but from the 'Annual Summaries,' p. 191, it appears that the former is the correct date). In collection of late Mr. E. H. Rodd; and now in that of Mr. F. R. Rodd ('Birds of Cornwall,' p. 25). "Several birds of the year were caught on Scilly Islands in the autumn of 1849. Supposed from their condition and plumage that they might have been bred somewhere in Great Britain ('Birds of Cornwall,' p. 25).

Summary.—The records here collected show that (even including the doubtful occurrences) not more than about thirty-five or forty examples of the Woodchat are known to have been killed in Great Britain. These have been obtained in various English counties ranging from Northumberland to Cornwall (Scilly), but chiefly in those of the eastern and southern coasts. In addition, the Woodchat has been recorded as having been seen on ten or a dozen other occasions. It has been recorded as breeding at least twice in the Isle of Wight, and other nests and eggs are supposed to have been taken in England as above mentioned.

NOTES AND QUERIES.

MAMMALIA.

On the Change of Colour in the Fallow Deer as observed in the New Forest.—When recently reading Mr. F. E. Beddard's interesting work on 'Animal Coloration,' I came across the statement that, with the exception of the Manchurian and Japanese deer, there is in the summer and winter dress of the deer species, "no alternation between a spotted and an unspotted condition." This, and other statements that have from time to time come under my notice, when the common English Fallow-deer has been the subject of discussion, lead me to think that the change of coat that takes place in this species when, as in the New Forest, in a perfectly wild condition, has escaped the notice of naturalists, and that a description of what annually occurs among these deer may be of interest. In the New Forest, during May, June, July, and August, *all* the Fallow-deer are uniformly of a light red colour, spotted thickly on the flanks with white and light grey spots—such, in fact, as in parks are termed "fallow" deer. In September the coat begins to change, and by November *all* the deer are uniformly a very dark brown, almost black, on the back and sides, shading off to a light dun on the flanks, belly, and legs, without any spots at all. The white patch below the tail is unaltered, but is rather more conspicuous in winter than in summer, owing to the darker colour of the animal. In some individuals the spots in summer are brighter and more numerous than in others: in winter there is but little difference, except that the bucks are, as a rule, slightly lighter in shade than the does. Both of these winter and summer colours are common enough in parks; but in every case that has come under my observation, those deer which are red and spotted in the summer, remain of the same hue in winter; and those which are dark or black at one season of the year, remain of that colour during the whole twelvemonth. What would be interesting to know is, whether in other places where Fallow-deer are genuinely wild—not where semi-domesticated deer have been turned out and allowed to breed—the same biennial change of colour takes place, and if so, how it comes about that confinement in an enclosed space has altered the habit of the species, as in most parks it certainly has. Wild Roe-deer, as no doubt most readers of 'The Zoologist' know, change colour in summer, being at that period much the shade of red of a fox; in winter their colour assimilates nearly to that of a Red-deer. The New Forest deer are the lineal descendants of those which, whether indigenous to this county or not, were existing in that district at the time of the Norman Conquest, when most of the tract of land in which they now roam was afforested. Though their numbers have fluctuated very greatly at different times, yet from that day to this wild Fallow-deer have never been banished from the woodlands of this part of England. Fresh blood may possibly have been introduced from time to time, but the only authentic record of anything of the sort that I am aware of, is that of an importation of Scandinavian deer, very dark in colour, by James I. There can therefore hardly be found a more perfectly wild, undomesticated herd of Fallow-deer than the small remnant which now exists of the thousands which abounded there within the recollection of hundreds of people now alive. There has lately been some discussion in your pages on the subject of albinism in various animals. It may interest your readers to know that in 1883 an albino doe fawn was dropped in New Forest. It was at first of a pale chestnut, gradually becoming cream-colour. I killed the animal ultimately, and it had all the appearance of an albino, with the iris of a very pale yellow; but during its life it produced three fawns, which were all of the same colour as itself, though their sire must have been of the ordinary colour: of these the only one that reached maturity had eyes of the same description as the original doe.—Gerald Lascelles (The Queen's House, Lyndhurst).

Wolves in France.—The French Minister of Agriculture, publishing the annual statement with regard to the number of Wolves killed and of the premiums paid for their destruction in France, states that the total for 1891 was 404, of which 149 were full-grown animals and 253 cubs, the amount paid for their destruction being £1013, at the rate of £4 for a full-grown animal and £1 12s. for a cub, a small extra sum being given for she-wolves with young. The number of Wolves destroyed was considerably less than it had been in any previous year, the figures being 461 in 1890, 515 in 1889, 760 in 1886, and 1316 in 1883, when as much as £4200 was paid in premiums, and in that year no fewer than nine wolves were killed which had attacked human beings. By far the most wolves were killed in the central and south-western departments, such as the Dordogne (67), the Charente (47), the Creuse (20), and the Vienne (15); while only one was killed in the three Pyrenean departments, and none in the three Alpine departments.

The Polecat in South Wales and Bucks.—It may interest you to know that on Sept. 1st I received a live wild female Polecat, which was caught uninjured near Whitland, South Wales. From its appearance I should think it was bred this year. The keeper who caught it says he has trapped eighteen within the last eighteen months. I have also heard of several being seen in Bucks this summer near Aylesbury; one, a big dog Polecat, had been known for several months to be lying about a brick-yard on the outskirts of Aylesbury, and was killed in July last by a man with a stick in a back yard in a row of small houses near the brick-yard, where it had apparently come after some tame rabbits the man had in his yard. I know of one now, in a village near Aylesbury, which is often seen by a hay-rick; it is believed to live in the thatch, as it has been seen climbing up. My old dog Polecat, from which I have bred with Ferrets for four seasons, died last spring, I believe from old age; he was an old one when caught. My younger one, now in his second breeding season, is well, and the sire of some young half-bred ferrets born on the 2nd August last.—J. H. B. Cowley (Callipers, King's Langley).

Rats stealing Gooseberries.—Mr. G. Reade, of Milnthorpe, Westmoreland, writing to a contemporary says:—"The ripe gooseberries (Aston Reds) in my garden were disappearing from the trees very fast, and I considered that it was the Blackbirds that were taking them. However, my housekeeper called my attention to a large Rat taking the berries off with his mouth and dropping them to other Rats below; after waiting quietly, another climbed the tree and helped to gather the berries. In a little time they both came down, each with a berry in its mouth, having a curious appearance. I saw them several times repeat the performance. I then placed a wire cage-trap under the tree, and in three days caught nine of them. I have known them steal grapes and some other fruits, but this is the first time in my life that I have known Rats steal and eat gooseberries."

Field Mice and Rooks.—While the attention of naturalists is being drawn to the subject of Field Mice by the plague of these creatures which is now devastating hundreds of acres of Scotch soil, it may not be uninteresting to describe the systematic way in which, under favourable circumstances, Rooks hunt and destroy them. In the winter of 1889, while living in the Thuringia Wald, I noticed that a large stubble-field, a few hundred yards from where I lived, was much frequented by Rooks. They seemed to be standing about in an idle sort of way, excepting that they cawed rather frequently, and thereby excited my curiosity. One or two of them had their beaks buried up to the hilt in the ground, and remained for longer or shorter times in such an attitude. They all flew away when I approached to examine the spot. I could find no trace of any special operations, no digging or scratching, and I was much puzzled as to what they were about. This happened morning after morning, and the object of their assembling in the stubble-field threatened to remain a perpetual puzzle to me in spite of all my efforts to make it out. One frosty morning, however, it was all made clear. The cawing of the original assemblages had evidently been successful, and the field was almost covered with their coal-black *confrères*. They were very silent and very busy, with their beaks buried in the earth and their tails sloping upwards; after remaining in this attitude for some seconds, each one would, with a short, hurried movement forward, thrust his beak in again. They were clearly hunting Field Mice. On visiting the field next morning the whole plan of operations was clear. There was not a Rook to be seen; but during the night a slight snow had fallen, which the wind had scattered so that it lay only in the furrows and slighter depressions in the soil. The beaks and feet of the Rooks of the day before had evidently slightly crushed in the mice runs, and in the shallow furrows thus made the snow was lying. An enormous irregular but close network of wavy white lines was seen to spread out over the field. So close was this network of runs that it was quite clear why so many Rooks were necessary. With a small number it would be impossible to close the runs; hence a daily assemblage with no result until by persistent cawing a sufficient number of Rooks were gathered together for a successful systematic attack. The runs are probably found by diligent probing of the ground with the beak, and when found, are systematically worked in such a way that two or more Rooks gradually approach one another. The unlucky Voles would thus find their runs blocked up in all directions by the beaks of their enemies, slowly and inexorably advancing towards one another. If undisturbed, it is clear that

Rooks could in this way exterminate all the Voles in a field, and this is probably what happened in this case. At intervals of three or four yards along the runs, the holes were found through which the Voles had been pulled out of the ground. If two Rooks met along a run, there would generally be two holes, about four inches apart, sloping inwards towards one another; and not infrequently there were signs of a great struggle close to the hole, which I took to mean that only one Vole had been pulled up, and that the Rook which unearthed him had to fight for the booty. Sometimes, where three runs crossed, there would be three holes forming a small triangle; round some of these groups of holes the signs of battle were terrific. In some cases the earth between the three holes had been torn up so that there was only one large triangular hole. The three Rooks had probably simultaneously seized a single unfortunate Vole, and the struggle to pull him into three parts resulted in tearing up the soil. So numerous were these holes, each one meaning the death of one, two, or three Voles, that I have no doubt the Rooks did their work thoroughly. I saw no more of them in the field the whole winter.—HENRY M. BERNARD.

Barbastelle in Gloucestershire. — Referring to the note under this heading in your last number, I cannot plead guilty to overlooking the occurrence of this Bat in my own town. The specimen in question was caught in a remote house close to a great wood, nearly three miles from Stroud.—C. A. WITCHELL (The Acre, Stroud).

BIRDS.

The Siberian Pectoral Sandpiper in Norfolk.—Through the vigilance of Mr. Lowne, of Yarmouth, I am enabled to record the addition of yet another rare straggler to the already long list of Breydon rarities. On the morning of the 30th August, Mr. Lowne called upon me with a small wader, in the flesh, which he said puzzled him, asking me if I could name it for him. Not having any special general work on this class of birds at hand, I was equally as puzzled as Mr. Lowne. I therefore sent the bird on to Mr. Gurney, who in returning it stated his belief that it was an example of Horsfield's *Tringa acuminata* (*T. australis* of Gould), the Sharp-tailed Sandpiper of American authors, with which opinion, aided by the description in Mr. Seebohm's 'Geographical Distribution of the Charadriidæ,' the figures in Gould's 'Birds of Australia' (vol. vi. pl. 30), and after examining two specimens in the Norwich Museum, marked "Australia" and "New South Wales" respectively, I fully concurred, and this determination of the species was subsequently confirmed by Prof. Newton. This species, which closely resembles *T. maculata*, from which it chiefly differs in having all the under parts spotted, and which was originally described by Horsfield from a specimen procured in Java, is known to be a regular winter bird in Australia, breeding in Eastern Siberia, where it occurs plentifully; in

Alaska it is met with in autumn. Mr. Seebohm states that examples have been obtained in the middle of June in the valley of the Argun River; it has been observed on Behring's Island during the autumn migration. It passes along the coasts of Japan and China, and has been frequently obtained on many of the islands of the Malay Archipelago from Java to New Guinea. It winters in Australia and New Zealand. I cannot find that it has previously been recognised in Europe. The occurrence of this species in England is certainly of considerable interest, and Mr. Thomas Ground, of Moseley, near Birmingham, who was fortunate enough to shoot it, has favoured me with the following particulars of his meeting with it:—"I only saw the bird just as it alighted, and it did so in perfect silence; it then remained quite still, as if examining the ground; the other birds all took a short run. I fired on the instant, and it fell dead. A Ringed Plover also fell to my friend's shot at the same moment. The precise locality was on the Breyden mud-flats at the end nearest Yarmouth, on one of the flats which are left dry, or nearly so, at high tide. The date was the 29th August. The tide had been running out about an hour. Had I recognised the bird as a stranger, I should have taken care to have given it an opportunity of displaying itself." It is curious that this bird should have been killed in the same locality as the first example of its New World ally, the Pectoral Sandpiper, which was met with on the 17th October, 1830. Mr. Ground's bird proved to be a female by dissection, probably fully adult; the legs when fresh were olive-green, the inside of the mouth flesh-coloured. The following comparative measurements of three of these birds,—No. 1 from "Australia," No. 2 from "New South Wales," and No. 3, the recently-killed Breydon specimen,—will show that individuals of this species, like the Pectoral Sandpiper, differ considerably in size:—

	No. 1.	*No. 2.*	*No. 3.*
Bill along the culmen	25 mm.	22 mm.	24 mm.
Wing from carpal joint to end of first primary (the longest)	135 „	137 „	129 „
Tarsus	32 „	30 „	28 „
Middle toe and claw	30 „	28 „	28 „

On comparing the principal measurements of the above three specimens of this bird with the average of twelve examples of *T. maculata*, I find the wing from the flexure to the end of the first quill-feather is much shorter (133·6 mm. against 138·58 mm.); the bill also is much shorter (23·6 mm. against 27·83 mm.); on the other hand, the tarsus is longer (30 mm. against 28·6 mm. in *T. maculata*), as is also the middle toe and claw (28·6 mm. against 27 mm.). As this species so closely resembles the

Pectoral Sandpiper, it would be well for those possessing British-killed specimens of the latter to examine them with a view to ascertain that they are correctly referred to the American species, with which Mr. Seebohm says it appears to intergrade, and it may be that at some future time I may have to return to the subject.—T. SOUTHWELL (Norwich).

Eared Grebe in Norfolk.—When boating on Rockland Broad, near Norwich, with my brother, on July 28th, we were much interested in seeing an Eared Grebe, *Podicipes nigricollis.* It was in full summer plumage, the golden-brown feathers behind the eye forming a striking contrast to its black head and neck. When first observed it was swimming at the edge of some growing water-plants. After a good look at it through our telescopes we rowed closer, but when about twenty-five yards off the the bird rose, the white on the wings being conspicuous. Shortly afterwards we saw it near a reed-bed on another part of the Broad, but when rowing towards it a gentleman in a small boat disturbed it, and again it took wing. We noted its resting place, and slowly paddled to within about twenty yards; it flew a short distance and settled on our lee. Sitting quite still, we allowed our boat to drift, and the wind slowly carried us to within ten yards before it again took wing. An hour later, on our way off the Broad, we again saw it near the place where we had first noticed it. Some authorities state that when this bird is disturbed it dives and does not fly. During the time we watched it we did not see it dive. The Eared Grebe is sometimes met with in Norfolk in the spring, and more rarely in the autumn. I cannot find any record of one being seen in July, Mr. Booth, in his 'Rough Notes on British Birds,' mentions that a man once brought him an old bird and two young, but he did not take a note of the date.—EDWARD BIDWELL (Twickenham).

Eared Grebe and Tufted Duck in Anglesea.—While shooting at a small lake in Anglesea on the 1st of August last, I obtained a male Eared or Black-necked Grebe, *Podicipes nigricollis.* There were also on the water a number of Coots and Little Grebes, but this bird was feeding by itself. Is this not a very unusual date to find this species, which has generally only been taken as an accidental visitor in the spring or autumn migration? Can any of your correspondents give an explanation of its occurring at this time, and also of the state of its plumage, which is either that of a young bird, or after the autumn moult, as it has no trace of the nuptial plumes. The same day, a Tufted Duck, *Fuligula cristata*, was obtained on the lake, which species, I am glad to say, appears to be fairly established as a resident in Anglesea. I have now seen this duck in breeding plumage in Anglesea, Cheshire, and Northumberland.—T. A. COWARD (Bowdon).

A Brood of Pied Blackbirds.—A brood of Blackbirds, all more or less marked with white, has been reared this summer by the parent birds (which are normal in colouring), in a garden at Fallowfield, not far from here. I quote the above on the authority of my friend Prof. W. Boyd Dawkins, to whom the garden belongs. — DOUGLAS STUART STEWART (North Leigh, Prestwich, Lancashire).

Range of Cinclus melanogaster pyrenaicus.— In my recent article on Swiss birds (p. 11), I described some Dippers with head and neck conspicuously pale, but entirely wanting the chestnut band on the belly, and looking very dark-coloured underneath. These birds, which I found on the Aare at Meiringen, puzzled me very much at the time; but on reading an article by Mr. Dresser in the last part of 'The Ibis' (p. 382) on White-breasted Dippers, I find that he describes a form from the Pyrenees similar to the birds which I saw. It appears then that this form is also found in Switzerland. On the Engstlen Alp (6100 ft.), about 4000 feet above Meiringen, I saw an undoubted example of *C. albicollis,* which *has* the chestnut band.— O. V. APLIN (Bloxham, Oxon).

Ruddy Sheldrakes in Ireland.— On the 19th August, my friend Mr. John McConnell, of Burt, sent me, for identification, a duck which he had shot out of a flock of six on Burt Slob, near Inch, Lough Swilly, on the previous evening. I was delighted to find it was a Ruddy Sheldrake, a young male, in perfect plumage. The wing-coverts were pure white, and the primaries almost pure black, and there was no trace of the dark ring round the neck—not a feather showed marks of captivity. I know of no ornamental water on which ducks are kept in Co. Donegal or the surrounding districts of Co. Londonderry, and I think we may safely assume that this flock was of genuine wild birds. — D. C. CAMPBELL (Londonderry). Communicated by R. J. USSHER.

Ruddy Sheldrake in Co. Donegal.—Prof. Leebody, of Londonderry, has kindly furnished me with the following facts:—A flock of six Ruddy Sheldrakes was seen at Inch Reclamation Slob, on August 18th. One was shot on the 18th or 19th by Mr. McConnell, of Inch, and was stuffed by McCourt, of Derry. It is a young male in very nearly complete plumage. Three of these birds remained at Inch for some days.—H. C. HART (Carrablagh, Port Salon, Letterkenny).

Ruddy Sheldrake in Co. Dublin. — A flock of five of these birds appeared at Skerries in the latter part of June, of which three were shot, two unfortunately not preserved. Another was shot a week later at Drogheda, probably part of the same flock. I have heard of another shot at the same time at Portarlington, Queen's County. — E. WILLIAMS (2, Dame Street, Dublin).

Ruddy Sheldrakes in Buckinghamshire.—During the past four years no less than ten Ruddy Sheldrakes have been hatched and reared at Stoke

Park, near Slough. Of these only two were caught and pinioned; the rest flew away usually when the frost and snow came.—H. Howard Vyse (Stoke Place, near Slough).

Ruddy Sheldrake in Lincolnshire.—A Ruddy Sheldrake, *Tadorna casarca*, was brought to me on September 1st by H. Stubbs, a wildfowler. It had been killed the same morning from a pool of water on Humberstone "fitties" by a Cleethorpe gunner, to whom Stubbs gave a couple of Mallards in exchange. The bird is apparently in immature plumage, and probably a female. A stormy S.W. wind had been blowing during the previous night.—G. H. Caton Haigh (Grainsby Hall, Great Grimsby).

Hoopoe in Norfolk.—On the 19th April last an adult male Hoopoe was brought to me. It was in exquisite plumage and a good state of preservation. It was picked up dead the day previously at Walcot. Having no wound or external hurt of any kind so far as I could see, I concluded that it had fallen a victim to the cold and rough weather which we had experienced during the previous week. On May 7th and 9th, 1890, a single Hoopoe was seen at Swayfield by Rev. F. S. Thew, he having previously seen one there in 1888. Two were killed in the neighbourhood of Yarmouth in 1885, but I think these have already been recorded in 'The Zoologist.'—Maurice C. H. Bird (Brunstead Rectory, Norwich).

Summer Birds kept through the Winter.—Under this title in the last number of 'The Zoologist,' is a note by Mr. J. H. Gurney. But what does he mean by "summer birds"? I have seen the Pied Wagtail in my garden in the depth of winter, and have kept it and the Grey Wagtail in an unheated, exposed aviary. The Greater Whitethroat, too, is a hardy bird, far more so than the Wheatear, which, however, is not delicate. The Swallow and the Blackcap might be called summer birds, although individuals of both species are sometimes seen with us in the winter. All the birds which Mr. Gurney mentions have been kept through the winter in England before—even the Swallow having been exhibited in two consecutive years at the Crystal Palace Bird Shows. I have been informed, moreover, that the exhibited specimens were from two different counties, though generally imagined to be the same individual. If this is so, it would show that it is less difficult to keep this bird in confinement during the winter than is generally supposed.—A. G. Butler (Beckenham).

Lapwings carrying their Young.—Most field ornithologists, at one time or other, in districts where Woodcocks breed, have seen the curious habit that bird has of sometimes removing the young by carrying them one at a time between the feet and legs, very much after the same way in which a hawk carries its prey. (See 'The Zoologist,' 1879, p. 433, and figure.) One day at the end of May last, while I was passing along a road in Southwick, a Lapwing flew over my head, holding between its legs, pressed up against its abdomen, with its tail at the same time much depressed, what I have every confidence in saying was a young one. The bird flew into the adjoining field, and I marked the spot, and on running up found a young one, perhaps four days old or so. Many years ago I saw a similar incident. and the belief is very general amongst country folks that Lapwings will, when any danger threatens, remove their young to safer spots by carrying them. Still I cannot find any reference to the habit in such ornithological literature as I possess. The carrying of their young must be a rare incident in the life of the Lapwing, otherwise it must have been noticed. But how are we to account for the certainly wide-spread belief of country dwellers that it frequently does so?—R. SERVICE (Maxwelltown, Dumfries).

Varieties of the Jackdaw.—I have just seen, in the hands of the local birdstuffer (Mr. Reeves, of Reigate), two curiously abnormal Jackdaws. One is almost perfectly white, although in certain lights a pale brownish tinge shows upon the sides. The legs are a light brown; the eyes normal. The bird is therefore not a true albino. It was shot in Hertfordshire, after having been seen about the neighbourhood for two years previously. The other was taken recently in this neighbourhood. In this bird, which is otherwise normal, the lower mandible projects, in an irregular, malformed fashion, quite half-an-inch or more beyond the upper mandible, which is very short. It is difficult to understand how the bird could possibly have obtained food, but it was in good condition and well nourished when it passed into the birdstuffer's hands. — E. P. LARKEN (Gatton Tower, Reigate).

Quail in Sussex.—On September 8th a Quail was killed by a reaping-machine in a barley-field of Mr. Tanner's, at Woolbeding, near Midhurst. It was found to weigh four ounces and a half. Quails are not common hereabouts, though Mr. Langdale has noted their occurrence in summer in the neighbourhood of Compton.—H. D. GORDON (Harting Vicarage, Petersfield).

Black-tailed Godwit in Co. Donegal.—A flock of six was seen at Inch Reclamation Slob on August 18th. Two were shot by Mr. H. A. Leebody on that date, but only one was secured. This bird, in immature plumage, was stuffed by McCourt, of Derry. Prof. Leebody also informs me that the Bar-tailed Godwit is not uncommonly seen at Inch, and that he has one in his collection.— H. C. HART (Carrablagh, Port Salon, Letterkenny).

Spotted Crake in S.W. Lancashire.—During the last few years the Spotted Crake, *Porzana maruetta*, has occurred at irregular intervals throughout this district. From notes, I find that an adult bird was killed by a telegraph-wire) at Prestwich in August, 1891; another was picked up on the outskirts of Bolton in September, 1891, having been killed in a similar way; and I have lately seen a mounted example, in good plumage, which was shot on the Ince marshes, near Wigan, on the 1st August last. Besides these, instances have at various times come under notice of its occurrence at Horwich and Chorley. From the peculiar circumstances attending the death of these birds, we may safely conclude that they were migratory visitors! Certainly I do not think it has nested in this part of the country during the last twenty years.—C. E. Stott (Bolton-le-Moors).

Pied Wagtail with Three Broods.—In a garden near here a pair of Pied Wagtails brought up, this year, three broods in the same nest.—E. P. Larken (Gatton Tower, Reigate).

Sky Lark singing at Night.—I send you an account of what I believe to be a curious and unusual phenomenon, and should be much interested to know if any of your readers have observed a similar occurrence. I happened to be out on a bicycle on the night of the 11th May last, when, it will be remembered, there was a partial eclipse of the moon. It was about a quarter to one, the eclipse being just over, when I caught the sound of a bird singing in the distance. I rode quietly on, when presently the air above me was filled with the rapturous singing of the Sky Lark. There seemed to be scores of them. How long they maintained the chorus I do not know. I rode slowly on, and gradually lost the sound in the distance. Some may think I am confusing the song of the Sky Lark with that of its ally, the Wood Lark; but I am quite familiar with the song of both of these birds, and am convinced that the singing I heard was that of the Sky Lark. Is it possible that these birds may have mistaken the cloudless re-appearance of the moon for the sunrise?—M. A. Laws (The Lodge, Little Clacton).

[The Sky Lark is not the only bird that warbles at night. We have heard it often on a June night, as also the Sedge Warbler, Reed Warbler, Grasshopper Warbler, Nightingale, and Cuckoo as late as 11 p.m., when the unmistakable notes of the Corn Crake were likewise incessant.—Ed.]

Speed of Homing Pigeons.—As showing what Pigeons can do under difficulties, it may be mentioned that at the pigeon-racing which took place on June 19th last between Piacenza and Rome, the first flight of birds was despatched from the former place at 6.16 a.m. in thick, misty weather, and that it rained heavily in Rome all day. Nevertheless, the first Pigeon reached Rome at 5 hours 6 min. 11 sec. p.m., and the second reached the capital only an hour later. Supposing the bird to have been one of those sent up in the first flight, it must have covered the whole distance of 415 kilometres (260 miles) from point to point in 10 hours 50 min. 11 sec. From experiments lately made to ascertain the dependence that could be placed on the pigeon-service between Ceuta and Malaga, it appears that the Spanish authorities could look with tolerable equanimity on any interruption of the cable between Morocco and the Peninsula. Out of twenty-four pigeons released at Ceuta, twenty-three arrived at Malaga in excellent condition, in spite of having travelled something like seventy-five miles between the two stations.

Willow Warbler in London.—Whilst staying in London for a few days at Kensington I heard, on the morning of August 13th, the sweet song of the Willow Warbler from the adjoining street. I thought, "Is it possible that anyone can keep a Willow Warbler in a cage?" but when the song was repeated I ran to the hall-door, and then saw the little songster flitting rapidly away in the direction of High Street, one of the most bustling and crowded streets in the West End. The bird had evidently rested for a few moments in one or two little trees in Allen Street, and was then probably on its way to Holland Park, which was not very far off. I have never met with this pretty warbler even in a village street before.—CHARLES W. BENSON (Rathmines School, Dublin).

[Ornithologists in London are quite accustomed to the appearance of the Willow Wren, Chiffchaff, Wheatear, Spotted Flycatcher, and many other summer migratary birds at the period of their migration in spring and autumn. Hyde Park, Kensington Gardens, and the Botanical Gardens, Regent's Park, are regularly visited by Willow Wrens.—ED.]

Note on the Black-headed Gull.—I was walking along the shore from Queensferry to Cramond, on August 20th, in search of plants, and at the same time keeping a look-out for birds. Near Cramond I halted to watch the sea-birds that were feeding on the extensive stretch of sand and shallow left exposed by the retreating tide. I heard a peculiar noise as of trickling water, but could not at first make out whence it proceeded; after awhile, however, I noticed that it came from a gull that was busy in a shallow pool not far from the land. This bird—a Black-headed Gull, though without the black head now—would walk one or two steps, halt and get into position, then, crouching somewhat, it would balance itself on its right leg, and with the other beat the water continuously, or sometimes it would use both feet in the performance and go through a sort of rude dance. Its object was apparent, as it always followed up its jumping manœuvres by seizing such creatures as it had managed to dislodge. This was an excellent plan for the bird to adopt, as thereby it was enabled to procure a plentiful food-supply within a short area, whilst other birds were walking about cautiously over the sand, and covering a much greater extent of ground to get the same amount of food as this gull, by a judicious expedient, was getting within the narrow limits of a single pool.—ROBERT GODFREY (46, Cumberland Street, Edinburgh).

Nesting Habits and Food of the Long-eared Owl.—I have examined a good many nests of the Long-eared Owl, *Otus vulgaris*. I have seen them in small thick belts of Scotch fir, and also in thick woods, but never very far from a path or road through the wood. Why is this? One nest was about 15 ft. from the ground, the other about 12 ft.; one was, I thought, on the base of an old Wood Pigeon's nest; I am not sure of the other. Round one were the remains of no less than eight rats, about one-third grown. I should not have written "remains," but rather dead ones, for it was the sight of two dead rats under the tree which first made me look about. I took the castings at the foot of both nests and soaked them in water, and made out the feathers of some finch and heads of small mice, &c. I cannot understand how folks who call themselves "sportsmen," or "lovers of nature," can allow Owls and Kestrels to be killed because a few cases have been proved in which they have killed winged game. I have Kestrels close to 340 young pheasants this season, and have not lost one of the latter. I have always found the remains of mice, beetles, &c., in the castings of Kestrels.—T. J. Mann (Hyde Hall, Sawbridgeworth, Herts).

[The reason for the proximity of Owls' nests to "a path or road through the wood," is probably that such a position enables the birds to get food for their young more easily and speedily. Keepers feed the pheasants in the rides; rats, mice, and small birds come out in these rides to pick up the pheasants' leavings, and are immediately seen by the Owl which is watching for them. The latter glides noiselessly off the bough on which it is sitting, picks up the "quarry," and is back at the nest in no time. If the nest were situated in a thick part of the wood, fewer vermin would be seen there, and the Owl would have to hunt at a distance from home, thereby wasting time, and incurring much additional labour. This hardly applies to the Barn Owl, however, which we have often seen hunting at a considerable distance from its nesting place.—Ed.]

An Eider-Duck Farm.—Writing to 'The Globe,' a recent visitor to Iceland thus describes the manner in which the Eider Duck is there protected for the sake of the eider-down of commerce, which is so highly esteemed:—"One of the larger Eider-Duck farms is situated on a small island in the bay at Reykjavik, and, with the permission of the owner, can be visited by strangers. Not much agricultural labour or ingenuity is expended by the Eider-Duck farmer upon his property. It consists for the most part of a large field of stunted grass, which has been blown by the wind and worked by the action of the weather into round hummocks, such as may be frequently met with all over the barren and devastated country of Iceland. In the recesses and cavities between the hummocks the Eider Ducks may be seen sitting on their nests. Of these there are several scores, and the birds themselves when sitting are perfectly tame, some of them even allowing a stranger to stroke them with the hand. They are not all hatched at the same time, and many are still in the egg when the others are hatched and swimming about in the sea. The drake is a handsome, showy creature, with much white plumage. He is excessively shy and wary, while the duck, whose plumage is brown and glossy, is, on the contrary, tame and confiding. The latter lays from five to six eggs at the beginning of June, and it is no unusual thing to find from ten to sixteen eggs in one nest, together with two ducks, which sit either at intervals or, if necessary, side by side, and, strange to say, they seem to agree remarkably well. The period of laying lasts six or seven weeks, and the birds are in the habit of laying three times in different places. From the first and second of these nests both the down and the eggs are taken away, but from the last it is very seldom that the farmer removes either. Should he do so with any degree of persistency the birds would desert the locality. In some cases the owner resides on or near the farm. In this particular instance he visited the island from the mainland once a week at the least. So soon as he and his men arrive at a nest they carefully remove the sitting female, and take away the superfluous down and eggs. The duck immediately begins to lay afresh, and covers her eggs with new down, which she plucks from her own breast. If the supply is inadequate, the male comes to her assistance and helps to cover the eggs with his down. This, being white, is easily distinguished from the brown covering which the duck supplies, and is not so good in quality. The nest is now, as a general rule, left until the young ones are hatched. There is not much callowness and helplessness about these youngsters. About an hour after they are out of the shell they quit the nest together, when it is once more plundered. The best down and the greatest number of eggs are obtained during the first three weeks of the laying period, and it has in general been observed that the birds lay the greatest number of eggs in rainy weather. The Eider Duck is a close and persistent sitter, and so long as she is sitting the drake, with commendable constancy, remains on the watch hard by, but as soon as the young are hatched, he considers his responsibility at an end, and leaves them to their own devices and the care of their mother. It is a curious and pretty sight to see how the latter looks after her brood. She leads them out of the nest so soon as they creep out of the eggs, and precedes them to the water, while they toddle after her. When she reaches the waterside she takes them on her back and swims with them for a few yards; she then dives, and the little ones are then left floating on the water like yellow corks, and henceforth are obliged to look after themselves. Indeed, the farmer seldom sees his flock again until the next breeding season, for they become comparatively wild, and live out among the damp rocks in the sea, where they feed upon insects and small crustacea and mollusca. Some idea of the value of the crop may be gleaned from the fact that one female during the whole time of laying generally gives half-a-pound of down, which is, however, reduced one-half after it is cleaned. The down is divided into *thang-dunn*, or sea-weed down, and *gras-dunn*, or grass-down. The latter is generally considered to be the best in quality. The down is very valuable, and fetches from 15s. to 30s. a pound. The three takes of down vary considerably in quality, the first being superior to the second, and the second to the third. The birds themselves, apart from their down-giving capacities, are of little value. The down taken from a dead Eider is valueless, as it has lost all its marvellous elasticity."

Canary-breeding in Germany.—Canary-breeding in Germany has, from the commencement, been chiefly a home industry of poor people. The principal seat of the industry was formerly the Hartz Mountains, where the poor mountaineers, engaged chiefly in the timber and mining industries, were in great need. Almost every family then had in the sitting-room, bedroom, or garret, a breeding-place for their birds. In the summer, the food necessary for the birds was easily obtained, and before the winter came the dealer had purchased them. After the Hartz Mountains became more frequented by visitors desirous of benefiting by the pure Hartz air, the poverty of the mountaineers was diminished, and the Canary industry fell off more and more. At present only fine singers are bred in the Hartz, and for these the dealer must pay a high price. The industry was then transferred to Eichsfelde, in the province of Hanover, where there are many very poor weavers. Nearly all these are now engaged in breeding the cheaper varieties of Canaries. The industry exists also in the poorer districts of Hesse, in the great Luneburg Moor, in parts of Westphalia, and among the Sudetic Mountains (Erzgebirge) in Saxony. In the fruitful districts of the province of Hanover, where there is not so much suffering, the business is not carried on so extensively. In recent years large numbers of birds have been bred in the cities, chiefly as a pastime. The extent of the Canary-breeding industry is shown by the fact that about 250,000 Canaries are bred every year in Germany. Among the foreign markets, the first is the United States, which takes, in round numbers, 100,000 birds annually. Next in importance is the English market, which takes about 50,000 per annum. Then come Brazil, Chile, the Argentine Republic, and Australia. To these countries salesmen are sent with Canaries every year. The remaining birds, especially the finer Hartz Mountain birds, are sold in Germany, where more value is attached to fineness of song, and where higher prices can be obtained than anywhere else. The average price for ordinary Canaries is from three to four marks for males. Hence the Canary industry adds about 1,000,000 marks per annum to the national wealth of Germany, and this amount goes chiefly into the hands of the poorest class. The growth of the industry is said to be due to two causes—(1) the German bird-dealers have already been very enterprising; and (2) the Canaries bred in Germany are said to sing better than any others. About two-thirds of the Canaries exported annually from Germany to the United States are imported by a German resident of New

York, whose German home is at Ahlfeld, in the province of Hanover, whither the birds are brought from all parts of Germany. At Braunlage, in the Hartz, this dealer has a factory which is capable of turning out every day the material for a thousand bird-cages. This material is given out to the peasants, who make the cages at home. From Ahlfeld the birds are shipped to New York *viâ* Bremen, accompanied by attendants. Each attendant has under his care about a thousand birds, each in its own little wooden cage.—*Journal of the Society of Arts.*

FISHES.

Large Carp in Sussex.—The Great Pond at West Harting, Sussex, has long been famous for its Carp, and doubtless in olden times (16th century) supplied a goodly number of these and other fish for the refectory of the monks of Durford Abbey, the ruins of which may be seen at no great distance. In the autumn of 1858, when this pond was cleared out, there were counted 900 Carp, one of which measured 34 inches in length, and weighed 24½ lbs.; 300 Tench; more than 1000 gold-fish; and at least a ton weight of eels, besides a Pike weighing 27½ lbs., in the act of digesting two Carp of 4 lbs. and 2 lbs. respectively. The monster Carp above referred to has been recorded as the largest taken in English waters, and has been figured (from a photograph taken by the late Mr. John Weaver, of Uppark) in Manley's 'Notes on Fish and Fishing' (1877), as well as in the 'History of Harting,' by the Rev. H. D. Gordon, published in the same year. In 1862 this pond, which once covered thirty acres, was again fished, and on that occasion, although the largest Jack did not exceed 18 lbs. and the largest Carp 13 lbs., upwards of 22 cwt. of Carp and Tench were taken, and nearly 8 cwt. of eels. The great Carp taken in 1858 has now been eclipsed by another which has quite recently been taken out of and returned to the same pond, and which (as we are informed by our old friend the Vicar of the parish, the Rev. Prebendary Gordon, M.A.), was ascertained to weigh no less than 29 lbs., the scales in which it was weighed having been tested by the police supervisor and found accurate. "*Carpe diem*"! we believe was the classical expression which fell from the lips of our informant on beholding this monster!—ED.

CRUSTACEA.

Nymphon and Caprella on the Coast of Sligo.—Early in September my sister, Miss Amy Warren, when searching for shells in the rock-pools on Carrahubbock shore, below Enniscrone, found two specimens of *Nymphon*, one of a reddish white colour, the other grey; and a specimen of that strange-looking crustacean, *Caprella*. The latter is exactly like the figure of the *Caprella* represented in Sir Wyville Thompson's book, 'The Depths of the Sea,' with this exception, that the hooks of the pair of hooked claws are flatter and wider than those of Sir Wyville Thompson's giant specimen, the specimen found by my sister being only half an inch in length. When closely examined under a powerful lens, it appeared a perfect miniature of that figured in 'The Depths of the Sea.' Five species of this genus are included by William Thompson in his list of Irish Crustacea (Nat. Hist. Ireland, vol. iv. p. 400).—ROBERT WARREN (Moyview, Ballina, Co. Mayo).

NOTICES OF NEW BOOKS.

Travels amongst the Great Andes of the Equator, with Supplementary Appendix. By EDWARD WHYMPER. 2 vols., 8vo, with Maps and Illustrations. London: John Murray. 1892.

THE story of Mr. Whymper's ascent of Chimborazo and other mountains of the great Andean range was given to the public, in outline, shortly after its accomplishment, and so long ago as 1881. In that year a lecture at the Royal Institution, and a paper in the 'Journal of the Royal Geographical Society,' made us fairly well acquainted with the chief features of this notable undertaking. During the decade which has since elapsed, Mr. Whymper has been occupied in preparing for the press a detailed narrative of his travels, illustrated with numerous beautiful engravings of the scenery which he viewed, and the more interesting objects, zoological, botanical, and ethnological, which he collected.

The result is now before us in the shape of two handsome volumes, and on perusing these we have been at a loss which to admire most, the author's indomitable pluck and perseverance in carrying out his original design, or his industry in transcribing the details of his eventful journey, and in preserving, examining and describing the collections made by him under very adverse and trying conditions.

It goes without saying that Mr. Whymper's work is a contribution to geographical rather than to biological science, and that being the case, it scarcely falls within our province to criticise what must be regarded as the most valuable portion of it. Nor does the author of that delightful book, 'Scrambles amongst the Alps,' stand in need of any introduction or commendation as a practised and skilful mountaineer. His reputation on that score has been long since established. If, therefore, we leave it to others to descant upon the services which he has rendered to geography by publishing this narrative of his travels, it is that we may have more space at command to deal with the services which he has rendered to zoology by collecting in an unexplored region, and submitting his collections to the critical examination of the specialists who have aided him in this part of his work.

It may be well, however, to observe *en passant* that one great object which Mr. Whymper had in view was to throw light on the long debated question whether human life can be sustained at great altitudes above the level of the sea in such a manner as will permit of the accomplishment of useful work, and to observe the effects of low pressure by attaining the greatest possible height in order to experience it. He therefore selected Chimborazo on account of its absolute elevation above the sea, and set forth to encamp upon this mountain at gradually increasing heights with the ultimate aim of reaching the summit.

Obviously very great pains were taken in comparing the readings of the mercurial and aneroid barometers. For the determination of altitudes, the former had to be relied upon, since, strange to say, seven selected aneroids taken on this expedition differed so materially, that even the "means" were almost valueless! The reason of this took several years to discover (see vol. i. p. 221); but Mr. Whymper at length made it out, and the results of his experiments will be found tabulated in the Appendix to his first volume.

The author's sea-route took him *via* Panama to Quayaquil on the Pacific coast, the chief port of Ecuador, whence he proceeded by river-steamer to Bodegas, and then on to Quito, the capital; the remainder of the journey having to be accomplished with mules.

Although the traveller's aim was to secure what might be found of interest in the highest zones of the Andes of Ecuador, he did not propose to examine zoologically the lower regions of that country, and for a very good reason. The latter have often been worked by professional collectors, and being easy of access, may be explored with comparatively little trouble at any time. The loftier and highest regions, on the other hand, had not previously been examined. They are more or less difficult to reach, and in consequence of the violent and rapid meteorological disturbances which frequently occur, are well-nigh inaccessible to all except those who are well equipped and prepared to remain for some time at a considerable height. Mr. Whymper's experience in these elevated regions convinced him that the work of collection there was the most arduous that a botanist or zoologist could undertake; and it is necessary to bear these facts in mind when considering the extent of his collections. These, it appears, were mainly entomological, with a few Crustacea, some Reptilia and Batrachia, and about fifty specimens of one species of a siluroid fish. No specimens of birds or mammals are catalogued in the Supplementary Appendix (vol. ii.), although here and there throughout the narrative, allusion is made to such as were seen and identified on the route; and at p. 215 of vol. i., we find a list of the Humming-birds found on Pichincha, situate on the Equator to the north of Quito. Here Mr. Whymper remarks:—

"The first competent naturalist who devotes his whole time to this mountain will reap a splendid harvest. After he has satiated himself with beetles and butterflies, he will be able to feast his eyes on the ruby and emerald breasts, and cyanine tails of the numerous Humming-birds abounding upon it and in its neighbourhood, which include some of the most remarkable and beautiful forms that are known. * * * * There is reason to believe that when more attention is paid to the habits and habitats of these birds, it will be found that several at least of the species which are said to be confined to particular localities will be found at other places at equivalent altitudes. Humming-birds in Ecuador are obtained through the Indians. Information as to localities is principally derived from them, and probably is frequently misunderstood."

On the dimensions of the Condor, Mr. Whymper has the following note (vol. i. p. 224):—

"The largest Ecuadorian Condor of which I have heard, is said to have measured 10 feet 6 inches from tip to tip of the wings. Most of those we saw at Antisana, and elsewhere, would not, I think, have measured so much as 9 feet."

On one occasion, while resting on the grass, he says:—

"A great shadow suddenly appeared in our midst, and made us all alive. A Condor had dropped down, and was hovering with outstretched wings about five and twenty yards above. The deerhounds ran in, cowering with terror, and casting furtive glances at the huge bird, whilst pressing against us trembling with fear. It was remarkable to see the fright that possessed these big dogs, when they were in perfect security amongst our large party. Shouts drove the assailant away, and presently we proceeded."

The way in which these huge birds are lassoed by the herdsmen is described (p. 205) with a graphic illustration from the pencil of Joseph Wolf.

The valley of Machachi is described as a perfect paradise for the zoologist (p. 115) :—

> "At first the dimensions of this great basin were underated or unappreciated. Objects which were supposed to be a mile distant sometimes proved to be two or three miles away. Woods looked liked clumps of bushes, and impassable ravines appeared mere ditches. When we became better acquainted with it, the bare almost naked-looking plain was found to contain unsuspected dells and nooks, decorated with ferns and hidden lanes, gay with Salvias, Fuchsias, and Verbenas; giving shelter to a countless population, varied in habits, and different in natures, whose range was determined by light and shade, heat and cold, moisture and vegetation; many timid and shrinking from observation, seldom straying far from the spots that were home or habitation, where they must be sought to be found.
>
> "Pumas and Deer ranged over the high, rugged ground; Foxes, Weasels, and 'Possums, dwelt on the lower slopes; and down in the basin was a zoologist's paradise. Butterflies above, below, and around, mayflies and dragonflies dancing in the sunlight, lizards darting across the paths, spiders, beetles, and crickets in infinite numbers."

The zoological collections which were made in Ecuador were formed with the view of bringing together the species which range highest. Thus the highest positions at which earthworms were found were on Cayambe (14,760 feet), and on the summit of Corazon (15,871 feet). Two new Centipedes belonging to the genus *Newportia* were found, one on Cayambe (11,800 feet), the other on Chimborazo at an elevation of 12,000 feet. No less than 104 new species of Coleoptera were collected, and have been described (in the "Supplementary Appendix") by Messrs. Bates, Sharp, Gorham, Oliffe, and Jacoby. Leaping Orthoptera were very numerous to the height of from twelve to thirteen thousand feet, and on Chimborazo were collected in the Vallon de Carrel at 16,000 feet. Earwigs, though not numerous in the interior, were found on Chimborazo (13,353 feet), and on Cayambe up to 14,000 feet. Dragonflies were seen higher than 12,000 feet on Pichincha and Cotocachi.

Of the Hymenoptera, the Ants only have been worked out, by Mr. Peter Cameron, but the collection included a large number of Bees belonging to more than a dozen different genera.

Messrs. Godman and Salvin, who have examined the Lepidoptera, report that twenty-nine species of Butterflies were obtained at elevations of 7000 feet and upwards, one of which *Pieris xanthodice* attains a higher altitude (9000 to 15,000 feet) than was observed in the case of any other butterfly.* A figure of this species is given on p. 357.

Amongst the Moths, Mr. H. Druce has recognised examples of twenty-three genera, some of which, as *Cidaria* and *Scordylia*, were found at an elevation of 13,300 feet, while the loftiest position at which moths were actually obtained was on the very highest point of Guagua Pichincha (15,918 feet). This moth was also the smallest of any taken in Ecuador.

Amongst the Diptera, Mosquitos were found above 7000 feet at one spot only, the elevation of which was 9000 feet. Spiders were met with on the summits of Corazon and Pichincha, and at other nearly equally elevated positions.

Crustacea were by no means numerous, but a small Amphipod, *Hyalella inermis*, of which a figure is given (vol. i. p. 361), is remarkable as having been captured in pools round about the Hacienda of Antisana (13,300 feet), and no Amphipod appears to have been hitherto obtained elsewhere at so great an elevation.

A pretty little Snake, *Coronella Whymperi*, named by Mr. Boulenger (vol. ii. p. 130) in honour of the traveller, and figured (p. 131), was found on Milligalli at an elevation of 6200 feet. Of this genus it will be recollected we have a representative in our English *Coronella lœvis*, or, as Mr. Boulenger terms it, *Coronella austriaca*. The new species, however, in appearance comes nearer to *Coronella decorata*, Günther, from Mexico.

Two small Frogs (*Prostherapis Whymperi* and *Hylodes Whymperi*) have likewise been described as new by Mr. Boulenger.

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* *Colias alticola*, however, a new species described by Messrs. Godman and Salvin, and figured (p. 364), is stated to have been taken on the west side of Antisana at the height of 16,000 feet.

Figures of these are given, as also of a third, *Phryniscus elegans*, Boulenger, a prettily variegated species which was found on Tanti at a height of 1890 feet.

Lastly we must not omit to notice that curious little siluroid fish *Cyclopium cyclopum*, Humboldt, of which no less than fifty-one specimens were brought home by Mr. Whymper (p. 255) to settle the question whether more than one species had been described under different names by previous writers. These were submitted to the late Surgeon-Major Francis Day, and the results of his examination of them are detailed in the "Supplementary Appendix" (vol. ii. p. 137), where a full-page plate containing three figures of the natural size is given, the verdict being that all the specimens are referable to one species which is subject to considerable individual variation.

From the foregoing remarks it will be perceived that while Mr. Whymper had chiefly at heart the advancement of geographical science, he by no means neglected the opportunities which presented themselves for acquiring some knowledge of the fauna and flora of the great mountain range which he explored. On the contrary, considering the difficulties to be overcome, the altitude at which most of the work had to be effected, and the necessity for confining within very narrow limits the amount of baggage to be carried, Mr. Whymper may well be congratulated both on the extent and the variety of his collections.

If from the geographer's point of view we have left unnoticed the most important results of his journey, it is not for lack of appreciation of their value, but because, having but limited space at disposal, we have preferred to emphasize those points which naturally possess the greatest interest for our readers, and are least likely to be dwelt upon elsewhere.

The Naturalist in La Plata. By W. H. Hudson. 8vo, with illustrations. London: Chapman & Hall. 1892.

In this volume we have another record of South American travel, though of a very different kind to that just noticed. While Mr. Whymper was scaling the highest peaks of the Andes in an attempt to solve certain problems having no immediate connection with zoology, Mr. Hudson was dwelling in the plains and pampas of La Plata, devoting all his energies to an investigation of the fauna of that country; not as a collector so much as a patient and intelligent observer of the life habits of the many curious animals, both vertebrate and invertebrate, which came under his notice. The information which he has collected on this subject in the volume now before us is not only of great interest to naturalists, but, being founded on original observation, is extremely valuable, and in many instances novel.

We have been so long accustomed to find in the reports of collectors little more than a list of the species collected, with localities and dates, that it is particularly refreshing to meet with a writer whose descriptive powers enable him to transport us, as it were, to the scenes with which he himself has become familiar, there to give us an insight into the haunts and habits of creatures about which most people in this country know next to nothing. With their external forms, doubtless, we may become acquainted by the aid of museums and zoological gardens, but of their true *rôle* in life, and their mode of existence, were it not for observers like Mr. Hudson, we should remain profoundly ignorant, while the study of zoology would be deprived of half its charm.

To give an adequate idea of the variety of information to be found in this volume, on the subject of South American mammals, birds, reptiles, and insects, is almost hopeless. Commencing with a description of the desert pampas and the characteristic animals which dwell there, we are presented in the second chapter with an account of the Puma, fuller than any account we have yet met with, except perhaps that given by Dr. Hart Merriam in his description of the Adirondacks. But even here Mr. Hudson has something new to tell us. In Patagonia he heard on all sides that it was extremely difficult to breed horses, as the colts were mostly killed by Pumas:—

> "As a fact wherever Pumas abound, the wild horse of the present time, introduced from Europe, can hardly maintain its existence. Formerly in many places horses ran wild and multiplied to an amazing extent, but this happened only in districts where Pumas were scarce, or had already been driven out by man. My own experience is that on the desert pampas wild horses are exceedingly scarce, and from all accounts it is the same throughout Patagonia."

But although so destructive to horses and sheep, it will be new to many to read that the Puma never attacks a human being:—

> "In places this animal is the only large beast of prey. It is notorious," says Mr. Hudson, "that it is there perfectly safe for even a small child to go out and sleep on the plain. At the same time it will not fly from man, except in places where it is continually persecuted. Nor is this all; it will not even defend itself against man, although in some rare instances it has been known to do so. The mysterious gentle instinct of this ungentle species, which causes the Gauchos of the pampas to name it 'man's friend'—*amigo del cristiano*—has been persistently ignored by all travellers and naturalists who have mentioned the Puma."

In support of this statement several good stories of adventure are told, some of which befel acquaintances of the author. In Chapter III., entitled "A Wave of Life," Mr. Hudson gives an account of a plague of Field Mice, belonging to the genus *Hesperomys*, which overran the district in La Plata in which he resided, just as those of the genus *Arvicola* have been overrunning of late the plains of Thessaly and the hill pastures of Scotland. In the attendant circumstances there are some curious points of resemblance, particularly in the way in which the "wave" of mice was succeeded by a "wave" of owls (*Otus brachyotus*) and Storks (*Ciconia maguari*), which preyed incessantly upon them, as did also the foxes, weasels, opossums, and even the common armadillo (*Dasypus villosus*). Of the last-named animal a very amusing account is given, including a description of the curious way in which it contrives to kill a poisonous snake (p. 72) by sawing it with the sharp edge of its carapace.

In the same chapter (on animal weapons) the author describes some of the natural methods of defence adopted by the Teguexin Lizard, the Wrestler Frog, and the Horned Toad, some of which are very singular. In succeeding chapters the following subjects are dealt with in turn,—"Fear in Birds," "Parental and Early Instincts," "Mimicry and Warning Colours in Grasshoppers," "Dragonfly Storms," "The Death-feigning Instinct," "Music and Dancing in Nature," and many others equally fascinating.

Mr. Hudson gives some curious instances of the paralysing effect of fear in animals. He was told by some hunters, in an outlying district of the pampas, of its effect on a Jaguar which they had started, and which took refuge in a clump of dry reeds:—

> "Though they could see it, it was impossible to throw the lasso over its head, and after vainly trying to dislodge it, they at length set fire to the reeds. Still it refused to stir, but lay with head erect, fiercely glaring at them through the flames. Finally it disappeared from sight in the black smoke; and when the fire had burnt itself out, it was found dead and charred in the same spot."

On the pampas the guachos frequently take the Black-necked Swan by frightening it.

> "When the birds are feeding, or resting on the grass, two or three men or boys on horseback go quietly to leeward of the flock, and when opposite to it suddenly wheel and charge it at full speed, uttering loud shouts, by which the birds are thrown into such terror that they are incapable of flying, and are quickly despatched."

The "death-feigning instinct," as Mr. Hudson terms it, which is commonly exhibited by beetles and spiders, is possessed also by some vertebrates. A familiar example is to be found in the Landrail, concerning which many instances of its feigning death have been recorded. Mr. Hudson observes that this curious instinct is possessed in a very marked degree by the Spotted Tinamu, *Nothura maculata*, the so-called "partridge" of the pampas.

> "When captured, after a few violent struggles to escape, it drops its head, gasps two or three times, and to all appearances dies. If when you have seen this, you release your hold, the eyes open instantly, and with startling suddenness and noise of wings it is up and away, and beyond your reach for ever."

These few extracts will convey but a faint idea of the variety of interesting subjects which are dealt with by the naturalist of La Plata. There is not a dull page in his book, and it is illustrated, moreover, by a number of very pretty "process-blocks," from drawings made by Mr. J. Smit, whose name will be familiar to all who have admired his beautiful plates of animals in the publications of the Zoological Society.

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